

Appl. No. 09/752,360
Amdt. dated January 6, 2004
Reply to Office Action of August 21, 2003

AMENDMENTS IN THE CLAIMS

Claims 14-22 were withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected invention. Please amend claims 1 and 5-10 as set forth in the following listing of the claims.

1. (currently amended) A planarized ultra fine particle film forming method for forming a planarized ultra fine particle film from a deposited film of ultra fine particles, comprising the steps of: formed by supplying the ultra fine particles to a substrate to form the deposited film of ultra fine particles, the method comprising one or more of a planarizing step of and planarizing a surface of the deposited film of the ultra fine particles supplied to the substrate.

2. (original) A planarized ultra fine particle film forming method according to claim 1, wherein the ultra fine particles are ceramic or metal ultra fine particles.

3. (original) A planarized ultra fine particle film forming method according to claim 1, wherein said

planarizing step rolls, scrapes, grinds or polishes a surface layer portion of the deposited film of the ultra fine particles supplied to the substrate.

4. (original) A planarized ultra fine particle film forming method according to claim 1, wherein said planarizing step presses a surface layer portion of the deposited film of the ultra fine particles supplied to the substrate.

5. (currently amended) A planarized ultra fine particle film forming method according to claim 1, wherein the deposited film is ~~either~~ applied with a mechanical impulse force, which is equal to or ~~higher~~ greater than Vickers hardness of the ultra fine particles, to the ultra fine particles supplied to the substrate to crush the ultra fine particles and make the particles bond together, ~~or not applied with the mechanical impulse force.~~

6. (currently amended) A planarized ultra fine particle film forming method according to claim 5, wherein the mechanical impact force is applied to the deposited film: by accelerating ultra fine particles by an electrostatic field or gas transport and spraying the particles to and colliding the particles with the ultra fine particles on the substrate; by using a brush or roller rotating at high speed, a pressure needle moving up and down at high speed, or a piston

moving at high speed by explosion force; or by generating ultra ultrasonic sounds.

7. (currently amended) A planarized ultra fine particle film forming method according to claim 5, wherein in accordance with the mechanical impact force to be applied to the ultra fine particles, the ultra fine particles are processed by a processing step enabling so that the ultra fine particles ~~can~~ to be easily crushed with the mechanical impact force in excess of a mechanical strength or a brittle fracture strength of the ultra fine particles.

Q 8. (currently amended) A planarized ultra fine particle film forming method according to claim 7, wherein the processing step of the ultra fine particles includes a process of the following group of processes is: adjusting a preliminary baking temperature of source ultra fine particles; heating ultra fine particles prepared to have a particle diameter of about several tens nm and aggregating the particles to form secondary particles having a particle diameter of about 50 nm to 1 μ m; or forming cracks in ultra fine particles so as to make the particles easy to be crushed, by using ~~for a long-time period~~ milling apparatus, a breaker, or a crusher, ~~such as~~ a ball mill, a jet mill, a vibration mill, an epicyclic mill and a bead mill.

9. (currently amended) A planarized ultra fine particle film forming method according to claim 1, wherein the deposited film is formed by a further step of applying an ion beam or plasma to the ultra fine particles supplied to the substrate.

10. (currently amended) A planarized ultra fine particle film forming apparatus for forming a planarized ultra fine particle film from a deposited film of ultra fine particles, which deposited film is formed by supplying the ultra fine particles to a substrate, the apparatus comprising: means for applying the ultra fine particles to the substrate, and means for planarizing a surface of the deposited film, the planarizing means including at least one of the following planarizing devices: an attached particle removal apparatus for rolling or scraping a surface layer portion of the deposited film of the ultra fine particles supplied to the substrate; a film surface processing apparatus for grinding or polishing the surface layer portion; and a pressure apparatus for pressing the deposited film.

11. (original) A planarized ultra fine particle film forming apparatus according to claim 10, wherein the substrate and said attached particle removal apparatus or said film surface processing apparatus are structured to be movable relative to each other.

12. (original) A planarized ultra fine particle film forming apparatus according to claim 10, further comprising a mechanical impact force, which is equal to or higher than Vickers hardness of the ultra fine particles, loading apparatus for loading a mechanical impact force to the ultra fine patterns of the deposited film.

13. (original) A planarized ultra fine particle film forming apparatus according to claim 10, further comprising a radiation apparatus for radiating an ion beam or plasma to the ultra fine patterns of the deposited film.

14. (withdrawn) A planarized ultra fine particle film forming method for forming a planarized ultra fine particle film from a deposited film of ultra fine particles formed by supplying the ultra fine particles to a substrate, the method comprising one or more of a planarizing step of planarizing a surface of the deposited film of the ultra fine particles by blowing planarizing fine particles having a grinding/polishing function at an oblique incidence angle toward the surface of the deposited film.

15. (withdrawn) A planarized ultra fine particle film forming method according to claim 14, wherein the planarizing fine particles are accelerated by using an

electrostatic field or gas and blown toward the surface of the deposited film of the ultra fine patterns.

16. (withdrawn) A planarized ultra fine particle film forming method according to claim 14, wherein the incidence angle of a flow of the planarizing fine particles relative to the substrate is in a range of - 60 degrees to - 5 degrees or + 5 degrees to + 60 degrees.

17. (withdrawn) A planarized ultra fine particle film forming method according to claim 14, wherein the planarizing fine particles have a same composition as that of the ultra fine particles.

18. (withdrawn) A planarized ultra fine particle film forming method according to claim 14, wherein the planarizing fine particles have a particle diameter larger than that of the ultra fine particles.

19. (withdrawn) A planarized ultra fine particle film forming method according to claim 14, wherein the planarizing fine particles have a rigidity higher than that of the ultra fine particles.

20. (withdrawn) A planarized ultra fine particle film forming apparatus for forming a planarized ultra fine particle film from a deposited film of ultra fine particles formed by supplying the ultra fine particles to a substrate, wherein planarizing fine particles having a grinding/polishing function are blown at an oblique incidence angle toward the surface of the deposited film.

21. (withdrawn) A planarized ultra fine particle film forming apparatus according to claim 20, further comprising a spray apparatus such as a nozzle and an electrostatic acceleration gun for jetting out, at the same time or separately, the ultra fine particles and the planarizing having the grinding/polishing function, toward the substrate, and a center axis of a jet flow of said spray apparatus being set in an incidence angle range of - 60 degrees to - 5 degrees or + 5 degrees to + 60 degrees relative to a surface of the substrate.

22. (withdrawn) A planarized ultra fine particle film forming apparatus according to claim 20, further comprising a spray apparatus such as a nozzle and an electrostatic acceleration gun for jetting out, at the same time or separately, the ultra fine particles and the planarizing having the grinding/polishing function, toward the substrate, and a flow of the ultra fine particles or planarizing particles jetted out from said spray apparatus being set to have a conical shape having an incidence angle range of - 60 degrees to - 5 degrees or + 5 degrees to + 60 degrees about a center axis of a jet flow of said spray apparatus.